65450

WATER BENEFITS SURVEY

INTERVIEWER HELP SHEET

HOW WILL MY INFORMATION BE USED?

Your answers will be accumulated with the answers of all other respondents. The fnformatfon obtained through the study will be used to atsf st people responsible for the quality of our environment in making informed policy decisions.

HOW WAS I CHOSEN TO BE IN THIS STUDY?
HOW DID YOU GET MY NAME?

Your household has been randomly selected for this study. Because only a small number of households have been selected, the participation of each one is extremely important.

WHO IS THIS STUDY FOR?

It is being conducted for Resources for the Future, a nonprofit research organization in Washington D.C. Resources for the Future's study is sponsored by the Environmental Protection Agency (EPA).

Appendix D

TEE RFF WATER QUALITY LADDER

William J. Vaughan

Water quality can either be described in terms of the uses for which a particular body of water is suitable or in terms of the objective characteristics of the water itself. In turn objective characteristics traverse a continuum from those that are readily perceptible to those that can only be detected by scientific measurement. In certain dimensions (e.g., visible phenomena such as the extent of algal growth, the clearness of the water, and the existence of suds, foam or debris (David, 1971)) people at large find it easy to preceive changes in water quality. However, some characteristics which delineate water quality levels more finely, such as dissolved oxygen content, escape visual and olfactory perception. Thus it is not surprising that people's ratings of water quality levels are likely to exhibit a less-than-perfect degree of association with any one or a combination of the several scientific measures of quality conditions (Binkley and Hanemann, 1978). This poses a problem for benefit l stkatfon because The existence of a positive willingness to pay for water quality improvement depends upon the ability of people to perceive water quality changes whensuch changes do, in fact, occur.

This prblem has lead previous investigators either to attempt to engineer the fortunate marriage of an objective water quality index (based on some weighted combination of scientific quality parmeters) and a subjective index of publicly perceived quality (Bouwes and Schneider, 1979) or to link subjective indices of public perception and expert perception (Dornbusch, 1973).

We chose to describe water quality primarily in terms of the uses for which water becomes suitable, and secondarily in terms of a few obvious water quality conditions (clearness, odor, debris, etc.). However, we located the numerical position of the five posited water quality levels (Boatable, Fishable-2 levels, Swimmable, Drinkable) by indexing a set of five objective scientific water quality paramters using a variant of the National Sanization Foundation's Water Quality Index (Booth et al., 1976; McClelland, 1974) along with informed judgment. In so doing ve hope to establish, ex-ante, an admittedly tenuous link between scientifically measured quality characteristics (anchors of the rating scale) and perceived water quality characteristics (the use and readily perceivable objective characteristic descriptors of these anchors).

Specifically,a number of sources were consulted to ascertain the minimally acceptable concentrationlevels of five measurable quality characteristics associated with five potential uses of natural water courses. These were fecal coliforms (organisms/100 ml), dissolved oxygen (mg/1), maximum BOD-5 (mg/1), turbidity (JTU) and pH.[1] The floe quality measures were the only ones for which numerical values could be obtained across all use classifications, a requirement dictated by the index approach. Particular attention was given to state water quality standards (North Carolina Environmental Management Commission, Doriman 1972)) because they report specific critical water quality paramters associated with a set (usually four or fire) of descriptive water quality classifications, The consensus results for each quality level are summarized in Table 1.

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[1]Sources consulted include Thomann (1971), G.S.G.S. (1978) , Pickle et al. (1973)) Davis (1968), Economics Research Associates (1979), Katz (1969), Doriman I c al. (1972), North Carolina, Environmental Management Commission, APHA, AWWA and FSIWA (1955), National Technical Advisory Committee (1968), NAS-NAE (1972), EPA (1976), Davidson, Adams and Seneca (1966), National Planning Association (1975).

Table 1. Conaenaue Water Quality Characteristics of Five Water Quality Classes

Water Quality Classification	Measurable Water Quality Characteristics				
	Fecal Coliforms (#/100 ml)	Dissolved Oxygen (mg/1)[a/]	5-day BOD (mg/1)	Turbidity (JTU)	Ph
Acceptable for drinking without treatment	0	7.0 (90)	0	5	7.25
Acceptable for swimming	200	6.5 (83)	1.5	10	7.25
Acceptableu for game fishing	1000	5.0 (64)	3.0	50	7.25

For example, the index value for the "Acceptable for Rough Fishing" classification was developed as shown below:

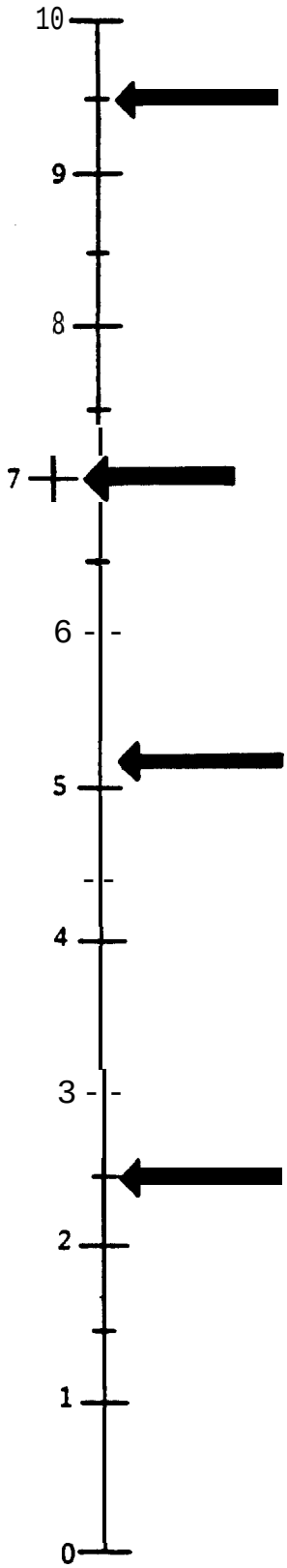
Characteristic	Value	Scaled Value (q_i)	Weight ($\hat{w}_i$)	Weighted Scaled Value ($q_i \hat{w}_i$)
Fecal Coliform	1000/100ml	20	0.242	L.985
Dissolved Oxygen	51%[a]	46	0.274	2.820
Max 5-Day BOD	3 mg/l	74	9.151	2.000
Turbidity	50 JTU	38	0.129	1.599
pH	7.25	93	0.194	2.049
				4.5

$$\text{Index} = \left(\prod_{i=1}^{5} q_i^{\hat{w}_i} \right) / 10$$

Notes:

[a] Percent saturation at 85°F.

Similar calculations for the remaining four classes yield the water quality ladder shown in Figure 1.



BECOMES ACCEPTABLE FOR DRINKING WITHOUT TREATMENT
-Character uniformily excellent for ingestion and all other uses.

BECOMES ACCEPTABLE FOR SWIMMING
-Suitable for water-contact sports; acceptable for public water supply with appropriate treatment.

BECOMES ACCEPTABLE FOR GAME FISHING
-Good fish and wildlife habitat.

BECOMES ACCEPTABLE FOR ROUGH FISHING (CARP)
-Satisfactory habitat for some wildlife and some common food fishes.

BECOMES ACCEPTABLE FOR BOATING
-Suitable for pleasure craft navigation.

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Appendix E OBSERVATIONS SET TO MISSING

In any national survey with a genuinely random sample, it is inevitable that a small percent of respondents will give apparently irrational answers. This is even more likely to be the case in a CV survey like this one because it demands more than the ordinary degree of respondent effort. Deleting the amounts given by these respondents is far preferable to retaining responses for which there is strong prima facie evidence that they are meaningless. Our quantitative criteria for identifying outliers was very stringent and every case identified by these criteria was individually examined to see if there were other factors which might justify its retention. In all, those deleted as outliers comprise about five percent of the respondents who gave us WTP amounts. The net effect of the WTP estimates of removing case was minimal because the too high and the too low bids cancelled each other out. Their removal did improve our regression estimates and the accuracy of our procedures for imputing missing values.

Fifteen respondents had their WTP values set to missing when they failed a preliminary edit based on the ratio of their informed WTP amount WTP(TOT_I) to their household income. The criterion we used for determining whether a given WTP amount was unreasonably high was whether it was five percent or more of the household's annual income.[1] These respondents and their background characteristics are listed in table A-1. Most are not recreational users of freshwater and one third did not think we should spend more than we arc now as a nation for reducing water pollution In answer to question lc.

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1. As measured by the lower end of the income interval, except for the under $5,0000 a year category where we used $2,500.

One respondent with an income of more than $100,000 gave a $WTPTOT_R$ of $10,560. Upon analysis, this appears to he a legitimate UT? amount as it is in keeping with that respond&t's strong environmental preferences as revealed in answer to other questions in the questionnaire and may be consistent with the person's Income constraint if, as we have no way of knowing because respondents only revealed income ranges, her household's income significantly exceeded $100,000. This observation exerts a fair amount of leverage In the regression equations (Belsley, Welsh and Kuh, 1980), due to the very small number of respondents with Incomes in this range. In order to achieve more stable parameter estimates, and to minimize the risk of upward bias from a single respondent, this respondent's WTP amount was arbitrarily set at $5,000.[2]

Ten respondents had their WTP values set to missing because their amounts were so low, given their income and environmental preferences, that there is a strong likelihood they they were confused or were really giving the equivalent of a protest zero instead of a genuine WTP amount. These people were identified by first separating out all respondents with an income of more than $15,000 who expressed support for current or increased government outlays for water pollution. If any of these pro-water pollution spending respondents gave $WTPTOT_I$ amounts of less than .1 percent of the lower end of their income category, their answers were deemed to be Invalid. Table A-2 lists the characteristics of each member of this group. Seven of the ten gave $0 WTP amounts. Their answers to the zero bid followup questions Indicated confusion about the waning of their bids. Of the remaining respondents, one gave a nominal $1 bid,one a more sizable but still small $10 bid, and a well off

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2. This reduces the mean $WTPTOT_R$ estimate by $10 from what it would beif the $10,560 amount were used.

respondent who strongly supports water pollution control volunteered only $22 even after he was informed that people in his income category were currently paying between $1,200 and 1,500 in taxes and prices for water quality.

Table A-l. CASES REMOVED BECAUSE WTP AMOUNTS TOO HIGH

ID	$WTPOT_R$	INCOME* ($ thousands)	AGE	EDUCATION	SEX	USER	WSPEND
1100	$380	2.5	49	2	F	No	4
1101	700	2.5	33	3	M	No	4
1152	400	2.5	20	4	M	Yes	Missing
2197	155	2.5	31	1	F	No	3
2308	600	5	37	3	F	No	4
1137	2700	15	33	4	F	No	Missing
2033	3500	15	37	3	F	Yea	5
2178	2100	20	32	6	M	No	5
2192	2500	20	55	1	M	No	3
1084	7000	30	52	3	M	No	3
2100	3000	30	30	2	M	Yes	3
1278	2790	35	35	4	F	No	5
2353	4990	40	36	5	M	Yes	5
2248	6500	50	42	4	F	Yes	4
2194**	4860	100	45	2	F	No	3

EDUCATION Six levels, 1 = Grade school or less, 2 = Some high school, 3 = H.S. graduate, 4 = Some college, 5 = College grad., 6 = Post B.A.

USER Whether respondent does or does not engage in freshwater based recreation.

WSPEND Respondent's answer to question lc, whether the money we are spending as a nation for reducing water pollution In freshwater lakes, streams, and rivers is much too much (1), too much (2), about the right amount (3), too little (4), or much too little (5).

* Lower end of respondent's income range. See appendix A, card 7 for information about the ranges.

** Income believed false and thought to be very low from Interviewer's comments and other evidence in the survey.

Table A-2. CASES REMOVED BECAUSE WTP AMOUNTS TOO LOW

ID	$WTPTOT_R$	INCOME* ($ thousands)	AGE	EDUCATION	SEX	USER	WSPEND
1181	0	15	25	2	F	No	4
1322	0	15	84	1	F	No	3
2031	10	20	23	2	F	No	3
1348	1	20	26	3	F	No	4
1245	0	25	50	4	F	No	0
2314	0	35	36	3	F	Yes	4
2266	0	45	48	5	M	Yes	5
1187	0	50	63	3	F	No	3
1367	0	50	36	5	M	Yes	3
2035	22	50	40	4	M	Yes	5

* Lower end of respondent's income range. See appendix A, card 7 for information about the ranges.

Appendix F. DERIVATION OF PAYMENT CARD ANCHORS AND HOUSEHOLD AIR AND WATER POLLUTION CONTROL EXPENDITURES

Table F-1 displays the anchors used on the various payment cards while table F-2 displays the range of amounts that respondents were told their households were paying for water quality and In some cases air quality. This appendix describes how those amounts were estimated. The procedure used is ad hoc, but tests conducted in the 1980 experiment and described In chapter 5 show that respondents are not sensitive to relatively large shifts in the position of the payment card anchors. a more elaborate effort to derive these amounts was not possible given the project's resources.

Two public goods, defense and space, are financed and provided strictly at the federal level. These two goods provide,with some exceptions to be noted, the basis for allocating the other public goods expenditures to the household level. The simplifying assumption we use is to assume that households pay for the other public goods in a manner similar to those of the two federal public goods and that this payment as well as provision is uniform across the country. This assumption, while obviously false -- particularly for locally provided goods such as education and police and fire protection, is a necessary simplification for doing national surveys. Our estimation method uses information on the distribution of federal income taxes and demographic information about the size composition of households in various income groups. Income security taxes and expenditures (Social Security and unemployment) are treated as a passthrough while other federal revenue is assumed to be collected in proportion to income taxes. The primary data sources used were the 1984 Budget of the United States (for budget year 1982 revenue and expenditures),

and the Statistical Abstract of the United States 1982-1983. For demographic information, other public goods expenditures, and some tax distribution Information). The water and air pollution expenditures are taken from the Commerce Department's Survey of Current Business with supplementary information taken from a number of other sources.

Federal revenue for budget year 1982 was $617.8 billion which can be divided into three categories, income tax ($297.7), income security ($201.5), and other taxes including corporate and excise taxes ($118.6). Here we divide revenue ($728.4) Into two categories, income security ($248.4) and other ($480.11. To arrive at a quantity we will call general federal expenditures ($526.9); we subtract the $201.5 in income security revenues from the $248.4 in income security expenditures and add this amount to the other federal expenditures. Performing this operation makes more reasonable the assumption that other federal tax revenue is raised in a manner similar to income taxes. The ratio of income tax revenue to nonlncome security federal revenue is 0.7151 (297.7/416.3).

For budget year 1982, federal expenditures on defense were $187.4 and $5.5 on space. The Statistical Almanac gives the public expenditures on elementary and secondary education, roads and highways, and police and fire. Where only one pre-1982 year was available, the data were scaled upward by the CPI. Water and air pollution expenditures are given in two Issues of the Survey of Current Business (Rutledge and Lease-Trevanthan, 1983) for 1981 and business expenditures for 1982 In Russo and Rutledge (1983). These expenditures are discussed in more detail in a later section of this appendix. We will use these public goods expenditures as ratios of defense spending. These ratios and the actual expenditures are given below:

Defense/Defense = 187.4/187.4 = 1.0000

Education/Defense = 112.4/187.4 = 0.5998

Roads and Highway/Defense = 38.72/187.4 = 0.2066

Space/Defense = 5.5/187.4 = 0.1703

Air/Defense = 31.9/187.4 = 0.1703

Water/Defense = 21.9/187.4 = 0.1173

In 1981, there were 82,368,000 households and 93,900,000 tax returns (individual and joint). We consider these two figures to be approximately equal for our purposes. For 1982, the average tax paid, the effective, and marginal tax rates for a single individual and family of four are shown In table 3 for different income levels.

Based on these figures, we developed estimates of defense spending for a single individual and a typical family. These are shown in table 4 for the Income tax port Ion only and in table 5 for total household expenditures (1.4 times those in table 4).

Demographic data from the 1980 Census shows that approximately 40 percent of the households with incomes below $20 thousand are single-member households while approximately 20 percent of those with incomes over $20 thousand are single-member households. Using these splits we arrive at per household defense estimates of $400 (for households with incomes under $10t), 4821 ($10-20), 1,740 ($20-30), 4.060 ($30-50), and 10, 952 (over $50).

To obtain household public goods expenditures for space, police and fire, and education, the household defense expenditures just given were multiplied by the ratio of total expenditures on that public good to defense expenditures given earlier. Roads and highways household expenditures were initially calculated in a similar fashion, but then were scaled by the following amounts: 120 percent (under 10), 110 percent (10-20), 100 percent (20-30), 90 percent (30-50), and 80 percent (over 50), in order to correct to some degree for the

regressive nature of gasoline taxes.

Water and air quality expenditures were first calculated in a manner similar to the other public goods above. These figures were $47, $96, $204, (476, and $1,285, respectively, for the different income groups and $68, $140, $296, $691, and $1,865 for air quality. These figures were derived from Commerce Department estimates of total expenditures by government, business, and individuals. Allocation of the Commerce Department totals is difficult since so much of the expense to households comes in an indirect form.

Since It was possible to present ranges for these household expenditures we relied on several sources: Lake and coauthors,; Gianessi and Peskin; Gianessi, Peskin, and Wolte; and CEQ (1980), which while somewhat dated provided valuable information on the distribution of cost to various types of households. Much of the household differences were related to regional and rural/urban differences, although both air and water pollution expenditures are regressive, particularly at the lower income categories. The ranges given respondents (table 2) were intended to include the amount most likely being-paid by that household while at the same time being informative.

Table F-l. ESTIMATES OF HOUSEHOLD ANNUAL PAYMENTS FOR SELECTED PUBLIC GOODS

	Under 10	10-20	20-30	30-40	50+
Space	12	24	51	119	321
Police and fire	48	98	207	484	1,305
Roads and highways	100	186	360	755	1,810
Education	240	492	1,044	2,435	6,569
Defense	400	821	1,740	4,060	10,952

Table F-2. ESTIMATES RANGES OF HOUSEHOLD ANNUAL PAYMENTS FOR WATER AND AIR POLLUTION PROGRAMS

Income Group	Water	Air
Under 10	$ 10-100	$ 1 5-500
10-20	70-150	100-195
20-30	175-300	265-420
30-50	400-600	650-850
50+	1,200-1,500	1,775-2,200

Table F-3. AVERAGE TAX, EFFECTIVE RATE AND MARGINAL RATE FOR SEVEN INCOME CLASSES FOR SINGLE AND FAMILY TAXPAYERS

	Tax Paid	Effective Rate	Marginal Rate
Single Income			
5,000	$ 216	4.3	14
10,000	1,043	10.4	19
20,000	3,442	17.2	31
25,000	4,942	19.8	35
35,000	8,292	23.7	40
50,000	14,468	28.9	50
75,000	25,718	34.3	50
Family			
5,000	-500	-10	--
10,000	322	3.2	14
20,000	2,013	10.1	22
25,000	3,137	12.5	25
35,000	5,904	16.9	33
50,000	10,911	21.8	39
75,000	21,086	28.1	49

Table F-4. ESTIMATED HOUSEHOLD ANNUAL DEFENSE EXPENDITURE (INCOME TAX PART ONLY)

Income Level	5-10	10-20	20-30	30-50	50+
Single	$629	816	1,758	3,551	9,150
Family	57	435	1,116	2,741	7,502

Table F-5. ESTIMATED HOUSEHOLD ANNUAL DEFENSE EXPENDITURE (TOTAL HOUSEHOLD EXPENDITURE)

Income Level	5-10	10-20	20-30	30-50	50+
Single	$880	1,141	2,458	4,966	12,795
Family	80	608	1,561	3,833	10,491

VERSION B

Please look at the water quality ladder agafn (Card 3). A major purpose of this survey is to team the value people place on reaching the three national water pollution goals. Because many people find it hard to say just how much these goats are worth to them in dollars, they somtimes ask us to tell them how much they are currently paying for water pollution control. We don't provide this information early in the interview because we want people to think about how much the goals are really worth to them without being influenced by information such as this.

Now that you have had a chance to think about this, we would like to tell you the dollar range paid for both water and air pollution control by households in your *income* bracket and offer you the chance to revfse your dollar amounts for water pollutfon, if you should wfsh to do so for any reason.

Before dofng this you need to know two thfngs. First, the actual amount people pay varies according to the sire of their household and other factors.

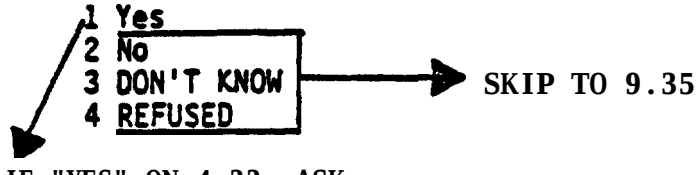
Second, it is uncertain whether paying this amount of money each *year will* provide enough money to reach any of the goals higher than boatable.

GIVE RESPONDENT APPROPRIATE CARD B9 FOR HIS/HER INCOME. Last year, households li kc yours paid between (READ RANGE FROM BELOW FOR RESPONDENT'S INCOME GROUP) for the nation's water pollution control programs. In addition, last year you also paid between (READ RANGE FROM BELOW FOR RESPONDENT'S INCOME GROUP) in. higher prices and taxes for air pollution control programs for the entire country, including this state. This amount of money will be enough to maintafn'present air quality in the country or perhaps slightly improve it.

INCOME GROUP	COLOR CARD	WATER POLLUTION	AIR POLLUTION
UNOER 510,000	WHITE	$10 to $100 +	$15 to $150
$10,000 - $19,999	YELLOW	$70 to $150 +	$100 to $195
520,000 - $29,999	BLUE	$175 to $300 +	$265 to $420
530,000 - 549,999	GREEN	$400 to $600 +	$650 to $850
550,000 OR MORE	PINK	$1200 to $1500 +	$1775 to $2203

POINT TO WORKSHEET.

33. Here arc the amounts you said you would be willing to pay for the three goals. Please feel free to change any of the amounts you gave for the three water quality goals, up or down. Remember, what we want is your realistic estimate of the hfghest amount of money each of these water quality goals is worth to you whether or not you are currently paying that amount. Would you like to make any changes? (PAUSE; IF RESPONOENT APPEARS HESITANT, ENCOURAGE RESPONDENT BY REPEATING RELEVANT PARTS OF THE QUESTION.)



IF "YES" ON 4.33, ASK:

34 What are the new amounts? (HELP RESPONOENT CHANGE THE AMOUNTS ON THE WORKSHEET INCLUDING TOTAL. RECORD THE NEW AMOUNTS ON FLAP.)

ASK EVERYONE:

35. One last question about the amounts you gave on the worksheet. What if the amounts you gave here were not enough to reach any of these three goals, including goal C, the obatable level where we are now. Would you (your household) be willing to pay anything more to try to reach any or all of these goals or are these amounts the most you (your household) would realistically gfve to reach each of them? (PAUSE, IF RESPONDENT APPEARS HESITANT ENCOURAGE RESPONDENT BY REPEATING RELEVANT PARTS OF THE QUESTION.)

MOST

27%
7:
(3)
(2)

514

1 Yes, willing to pay more
2 No, not willing to pay more
3 DON'T KNOW
4 REFUSED

→ SKIP TO 4.37

IF "YES" ON Q.35, 'ASK:

36. What is the most you (your household) would pay each year to reach each of goals C, 8, and A before you fee? you are spending more than it's really worth to you (all members of your household)? (HELP RESPONDENT CHANGE THE AMOUNTS ON THE WORKSHEET INCLUDING TOTAL. RECORD THE NEW AMOUNTS ON FLAP.)

WTPBM WTPFM WTPSM

SECTION E: BACKGROUND INFORMATION

This last section asks a few questions about you.

37. What was the last grade of regular school that you completed? Do not include specialized schools like secretarial, art, or trade schools.

EDUC

11% 1 Grade. school or less (0-8)
14 2 Some high school (9-11)
36 3 High school graduate (12)
22 4 Some college or junior college
11 5 College graduate (4 or 5 year degree)
7 6 Post graduate work or degree
(0) 7 DON'T KNOW
(3) 8 REFUSED

38. How many years have you lived in THIS STATE? (PROBE: Your best estimate will do. IF LESS THAN 1, ENTER 1.)

YISTATE

_____ Number of Years
(2) 98 DON'T KNOW
(2) 99 REFUSED

809 M 36 - 86

39. ASK ONLY IF NOT OBVIOUS: How would you describe your racial or ethnic background? READ CHOICES.

RACE

85% 1 White
9 2 Black
4 3 Hispanic
/ 4 Asian or Pacific Islander
/ 5 Or some other race (SPECIFY)
6 DON'T KNOW
7 REFUSED

INTERVIEWER NOTE:
White & Black = Black
White & Hispanic = Hispanic
Black & Hispanic = Hispanic

RACED 1= white

40. Please turn to the last card in the book -- Card 7. For classification purposes only, please tell me which category best describes one total income that you (and all other members of this household) earned durin 1982 before taxes. Please be sure to Include each member's wags and salaries, as well as net income from any business, pensions, dividends, interest, tips, or other income. Just tell me the number that best describes your household's income.

INCAT = categories

INCOME = continuous

over 100,000 = 150t
under 5,000 = 5t
others at mean

757

6%	A	1	UNDER $5,000
21	B	2	65,000 to less than $10,000
13	C	3	$10,000 to less than $15,000
13	D	4	$15,000 to less than $20,000
12	E	5	$20,000 to less than 525,000
9	F	6	$25,000 to less than $30,000
6	G	7	$30,000 to less than $35,000
6	H	8	$35,000 to Tess than $40,000
3	I	9	$40,000 to less than $45,000
2	J	10	$45,000 to less than $50,000
6	K	11	$50,000 to less than $100,000
I	L	12	$100,000 and over (set to $150,000)
(14)		13	DON'T KNOW
(42)		14	REFUSED

M=23,670

IF THIS IS A RESPONDENT-ONLY HOUSEHOLD, SKIP TO Q.42

41. How much of this total household income is income that you personally make? Is your share 75% or less of the total household income or is your share more than 75% of the total household income?

PINC

793

60%	1	75% (3/4) or less
50	2	More than 75%
(13)	3	DON'T KNOW
(7)	4	REFUSED

ASK EVERYONE:

42.1 would like you to think back to the questions I asked you about how much your-household is willing to pay to reach each of the three water quality goals, C, B, and A. We find that some people are more sure than others about the amounts they gave for Goals C, 8, and A. How about yourself? Would you say you are very sure, somewhat sure, somewhat unsure or very unsure about the amounts you gave for these goals?.

HSURE

775

52%	1	Very sure
31	2	Somewhat sure
12	3	Somewhat unsure
4	4	Very unsure
(31)	5	DON'T KNOW
(7)	6	REFUSED

CLOSING: Thank you for your time and cooperation.

SECTION F: INTERVIEWER'S EVALUATION

INTERVIEWER: COMPLETE THESE QUESTIONS AS SOON AS POSSIBLE AFTER THE INTERVIEW.

These two questions are only concerned with how the. respondent answered Questions 24 - 29, which asked the respondent to value the three levels of water quality.

43. Irrespective of whether or not the respondent answered G.24 - 29, in your judgment, how well did the respondent understand what he or she was asked to do in these questions?

INTUND

37% 1 Understooh completely

32 2 Understood a great deal

19 3 Understood somewhat

5 4 Understood a little

809 4 5 Did not understand very much

1 6 Did not understand at all

I 7 Other (SPECIFY):

NR (4)

44. Which of the following descriptions best describe- the degree of effort the respondent made to arrive at a value for the three levels of water quality?

33% 1 Gave the questions prolonged consideration in an effort to arrive at.the best possible value

40 2 Gave the questions careful consideration, but the effort was not prolonged

19 3 Gave the questions some consideration

5 4 Gave the questions very little consideration

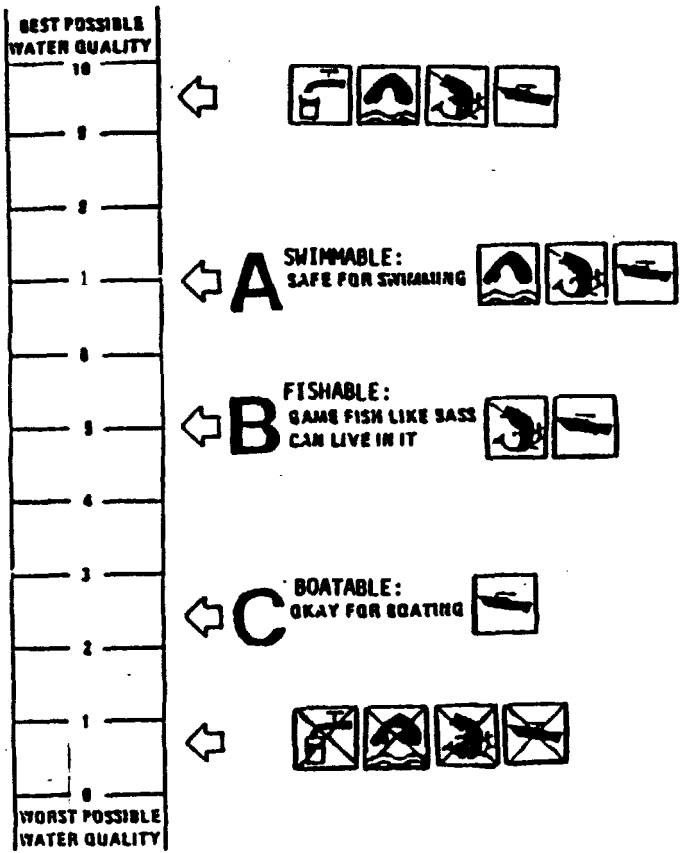
6 5 Other (SPECIFY):

NR 1%

WORKSHEET
(Reduced from Original)

PLEASE KEEP IN MIND

1. EVERY HOUSEHOLD IN THE COUNTRY HAS THE OPPORTUNITY TO SAY HOW MUCH THEY ARE WILLING TO PAY FOR WATER POLLUTION CONTROL.
2. YOU WILL CONTINUE TO PAY WHAT YOU ARE NOW PAYING FOR ALL OTHER ENVIRONMENTAL IMPROVEMENT PROGRAMS, AND THE AMOUNT YOU ARE WILLING TO PAY FOR WATER POLLUTION CONTROL IS IN ADDITION TO THESE OTHER AMOUNTS.



DOLLARS PER YEAR
IN TAXES AND PRICES

GOAL A
To raise national minimum water quality so that no water bodies are less than swimmable in quality, the most my household is willing to add ..... $ .00

GOAL B
In order to raise national minimum water quality so that no water bodies are less than fishable in quality, the most my household is willing to add ..... $ .00

GOAL C
The most my household is willing to add to maintain national minimum water quality so that no lakes, rivers or streams are less than boatable in quality is ..... $ .00

TOTAL AMOUNT TO REACH GOAL ..... $ .00

65450

PAYMENT CARD

ANNUAL HOUSEHOLD INCOME BEFORE TAXES

UNDER $10,000

(AVERAGE ANNUAL AMOUNT IN 1982 TAXES AND PRICES PAID FOR SOME PUBLIC PROGRAM)

$ 0	$ 45 -POLICE AND FIRE PROTECTION	$120	$270
1	50	130	280
2	55	140	290
3	60	150	300
4	65	160	320
5	70	170	340
10	75	180	360
15 -SPACE PROGRAM	80	190	380
20	85	200	400 – DEFENSE PROGRAM
25	90	220	420
30	95	240 – PUBLIC EDUCATION	440
35	100 – ROADS AND HIGHWAYS	250	460
40	110	260	480

65450

PAYMENT CARD

ANNUAL HOUSEHOLD INCOME BEFORE TAXES

$10,000 - $19,999

(AVERAGE ANNUAL AMOUNT IN 1982 TAXES AND PRICES PAID FOR SOME PUBLIC PROGRAMS)

$ 0	$ 90 -POLICE	$295	$550
5	100 AND FIRE PROTECTION	310	565
10	110	325	580
15	120	340	595
20	130	355	615
25 – SPACE PROGRAM	440	370	635
30	150	385	655
35	160	400	675
40	170	415	695
45	180	430	715
50	-ROADS AND 190 HIGHWAYS	445	735
55	205	460	755
60	220	475	775
65	235	490	795
70	250	-PUBLIC 505 EDUCATION	015
75	265	520	-DEFENSE 835 PROGRAM
80	280	535	855

65450

PAYMENT CARD

ANNUAL HOUSEHOLD INCOME BEFORE TAXES

$20,000 - $29,999

(AVERAGE ANNUAL AMOUNT IN 1982 TAXES **AND PRICES** PAID **FOR** SOME PUBLIC **PROGRAMS)**

$ 0	**$190** -POLICE	$ 620	$1140
10	210 AND FIRE PROTECTION	650	1180
20	230	680	1220
30	250	710	1260
40	270	740	1300
50	**290**	770	1340
-SPACE 60 **PROGRAM**	310	800	1380
70	330	830	1420
80	350	860	1460
90	**-ROADS AND** 380 HIGHWAYS	890	1500
100	410	-PUBLIC 920 EDUCATION	1540
110	**440**	950	1580
120	470	980	1620
130	500	1010	1660
140	530	1040	1700
150,	560	1070	1740 – DEFENSE **PROGRAM**
170	**590**	1100	**1780**

PAYMENT CARD

ANNUAL HOUSEHOLD INCOME BEFORE TAXES

$30,000 - $49,999

(AVERAGE ANNUAL AMOUNT IN 1982 TAXES AND PRICES PAID FOR SOME PUBLIC PROGRAMS)

$ 0	$ 450	$1445	$2720
15	**480-POLICE AND FIRE**	1520	2805
30	510 PROTECTION	1595	2890
45	**540**	1670	2975
60	570	1745	3060
90	600	1820	3145
-SPACE			
120 PROGRAM	630	1895	3230
150	**695**	1970	3315
180	**-ROADS AND 770 HIGHWAY**	2045	3400
210	a45	2120	3485
240	**920**	2195	3570
270	**995**	2270	3655
300	1070	2345	3740
330	1145	2420	3825
		-PUBLIC	
360	**1220**	2495 EDUCATION	3910
390	1295	2570	3995
420	**1370**	2645	4080-DEFENSE **PROGRAM**

PAYMENT CARD

ANNUAL HOUSEHOLD INCOME BEFORE TAXES

$50,000 AND OVER

(AVERAGE ANNUAL AMOUNT IN 1982 TAXES AND PRICES PAID FOR SOME PUBLIC PROGRAMS)

$ 0	$1150	$3860	$ 7410
25	1250	4060	7660
50	1350 — POLICE AND FIRE PROTECTION	4260	7910
75	1450	4460	8160
100	1550	4660	8410
150	1660	4860	8660
200	1760	5060	8910
250	1860 — ROADS AND HIGHWAYS	5260	9160
300	2060	5460	9410
350 — SPACE PROGRAM	2260	5660	9660
450	2460	5860	9910
550	2660	6060	10160
650	2860	6260	10410
750	3060	6460	10660
850	3260	6660 — PUBLIC EDUCATION	10910
950	3460	6910	11160 — DEFENSE PROGRAM
1050	3660	7160	11410

65450

CARD B9

Annual Household Income Before Taxes

Under $10,000

AMOUNT ACTUALLY PAID IN 1982 FOR WATER AND AIR QUALITY PROGRAMS

In 1982, households in your income group paid the following amount in local, state and federal taxes and in higher prices for:

All Water Pollution Control Programs — Between $10 and $100

It is uncertain whether annual payments at this level will be enough to reach the fishable and swimmable water quality levels.

In addition to this amount households in your income group also paid the following amount in local, state and federal taxes and in higher prices for:

All Air Pollution Control Programs — Between $15 and $150

Payments at this level will be enough to maintain the present level of air quality across the nation or slightly improve it.

CARD B9

Annual Household Income Before Taxes

$10,000 - $19,999

AMOUNT ACTUALLY PAID IN 1982 FOR WATER AND AIR QUALITY PROGRAM

In 1982, households in your income group paid the following amount in local, state and federal taxes and in higher prices for:

All Water Pollution Control Programs — Between $70 and $150

It is uncertain whether annual payments at this level will be enough.to reach the fishable and swimmable water quality levels.

In addition to this amount households in your income group also paid the following amount in local, state and federal taxes and in higher prices for:

All Air Pollution Control Proqrams — Between $100 and $195

Payments at this level will be enough to maintain the present level of air quality across the nation or slightly improve it.

65450

CARD B9

Annual Household Income Before Taxes

$20,000 - $29,999

AMOUNT ACTUALLY PAID IN 1982 FOR WATER AND AIR QUALITY PROGRAMS

In 1982, households in your income group paid the following amount in local, state and federal taxes and in higher prices for:

All Water Pollution Control Programs — Between $175 and $300

It is uncertain whether annual payments at this level will be enough to reach the fishable and swimmable water quality levels.

In addition to this amount households in your income group also paid the tollowing amount in local, state and federal taxes and in higher prices for:

All Air Pollution Control Proqrams — Between $265 and $420

Payments at this level will be enough to maintain the present level of air quality across the nation or slightly improve it.

65450

CARD B9

Annual Household Income Before Taxes

$30,000 - $49,999

AMOUNT ACTUALLY PAID IN 1982 FOR WATER AND AIR QUALITY PROGRAMS

In 1982, households in your income group paid the following amount in local, state and federal taxes and in higher prices for:

All Water Pollution Control Programs — Between $400 and $600

It is uncertain whether annual payments at this level will be enough to reach the fishable and swimmable water quality levels.

In addition to this amount households in your income group also paid the tollowing amount in local, state and federal taxes and in higher prices for:

All Air Pollution Control Proqrams — Between $650 and $850

Payments at this level will be enough to maintain the present level of air quality across the nation or slightly improve it.

65450

CARD B9

Annual Household Income Before Taxes

$50,000 and Over

AMOUNT ACTUALLY PAID IN 1982 FOR WATER AND AIR QUALITY PROGRAMS

In 1982, households in your income group paid the following amount in local, state and federal taxes and in higher prices for:

All Water Pollution Control Programs — Between $1,200 and $1,500

It is uncertain whether annual payments at this level will be enough to reach the fishable and swimmable water quality levels.

In addition to this amount households in your income group also paid the following amount in local, state and federal taxes and in higher prices for:

All Air Pollution Control Programs — Between $1,775 and $2,200

Payments at this level will be enough to maintain the present level of air quality across the nation or slightly improve it.

654150

LOCATION # _____

LINE # _____

FLAP

	Q.24 - Q.28	Q.29 CHANGES	Q.34 AIDED	Q.36 MOST
TOTAL AMOUNT	$_____.00	$_____.00	$_____.00	$_____.00
GOAL C BOATABLE Q.24	$_____.00	$_____.00	$_____.00	$_____.00
GOAL B FISHABLE Q.26	$_____.00	$_____.00	$_____.00	$_____.00
GOAL A SWIMMABLE Q.28	$_____.00	$_____.00	$_____.00	$_____.00

INTERVIEWER: THIS FLAP MUST BE ATTACHED TO THE FRONT OF EACH QUESTIONAIRE!!!

Appendix B DESIGN AND EXECUTION OF THE SAMPLING PLAN'.

The sampling plan for this study was designed by the Opinion Research Corporation (ORC) using standard area probability sampling procedures which ensure that every household in the continguous United States has a known or knowable probability of selection. The sampling procedures are described in materials prepared by ORC which begin on page B-3. They describe the multistage sampling process where (for this study) 63 primary sampling units were first selected. These were stratified by the four census regions and each is a large geographical unit or population center. At the next stage, a total 185 secondary sampling units were drawn wing probability sampling, the number being proportional to the population of the primary unit. The interviewers were assigned a designated starting point in each secondary unit and given explicit instructions as to which households were to be interviewed. The ORC sample is based on 1980 census data.

At the household level up to four attempts were **made** to obtain information about the composition of the household. If, after four visits, no one was home or if a refusal to be interviewed occurred no replacement was allowed. Sufficient assignments of households were made to ensure that the target number of interviews, 800, would be conducted.

Upon making the initial contact with the household, the interviewer obtained information from a household spokesman about the "heads of household" resident in the household. The interviewers were told there is no set definition of this concept and that anyone so designated by the respondents should be listed, in a set order, on the Face Sheet. The instructions make clear that multiple heads of household are acceptable. This designation is in

conformance with current Census Bureau procedure. Beginning with the 1980 census, the Bureau no longer automatically considered the husband the "householder" in married couple households. [1] The final selection of which household head to interview (if there was more than one) was made by a prespecified procedure which ensured that each household head, whether present at the time of the initial contact or not, has an equal chance of being selected. Once designated,no substitutions were allowed. The interviewers made up to four attempts to interview the selected respondent. The sampling instructions used by the interviewers are included in this appendix beginning on page B-11.

The response rates are described in the following materials. They are 78 percent of the eligible respondents and 56 percent of the eligible households. These rates are comparable with other studies using the 4 callback rate.

1. The Bureau no longer uses the term, “head of household ,” because " recent social changes have resulted in greater sharing of household responsibilities among adult members...” (Bureau of the Census, 1984). Instead it prefers “householder." In cases where adults are roomates, the Bureau counts as householder the person in whose name the dwelling unit is rented or owned. This differs somewhat from ORC's practice of listing all such adults and sampling from the list.

DESCRIPTION OF THE SAMPLE PREPARED BY THE ORC

The Sample

Area probability sampling is a procedure which produces an accurate, current, and convenient sampling frame. All households in the study area have a known probability of selection and individual people can be identified as members of only one household. ORC's national frame is generated through a multistage area probability process, where primary sampling units (PSU's), secondary selection units (SSU's), and starting locations are defined and selected.

Primary sampling units are the first stage of sampling. They broadly define where the sample is located, and are the source from which all subsequent selections are made. In most cases, they are individual. counties or groups of adjacent counties. Once PSU's have been selected, a smaller and more finely defined sample area is selected. These secondary selection units are smaller clusters of households, consisting of all housing units located in phone book areas. From these SSU's, starting locations are selected, defining the actual cluster of households from which the interviews are obtained.

ORC's National Sampling Frame. The selection of the new national sampling frame has been completed by ORC. Using 1980 Census figures and growth rates from 1970 to 1980, population projections were made for all counties in the contiguous United States for 1985. Population as well as housing unit projections were calculated. These projections are taken as the measure of size (MOS), for each county, and determine its selection probability. Thus, the actual MOS assigned to a county is:

$$MOS_{1985} = 1980\ \text{Population} + 1/2(1980\ \text{Population} - 1970\ \text{Population}).$$

The measure of size is based on 1980 projections, as opposed to 1980 Census figures, to provide the most usable frame. The national frame will be used from 1982 to 1992, when data from the 1990 Census should be available. We believe that the assumption of a constant growth rate from 1980 to 1990 is more accurate than a measure of size based on the 1980 Census, which would require updating the probabilities each year.

As a first step, the 1970 and 1980 Census files, containing figures for all counties, were merged, yielding ORC's 1985 projections. The rounded 1985 number of housing units was 84 million. Once these projections were finished, the counties were stratified in order to minimize sampling variances. Although counties are stratified on some key variables, no elaborate stratification scheme was used. This is consistent with the conclusion reached by the Census Bureau in the sample selection of the Current Population Survey:

> "The strata were . . . defined on the basis of available objective measures, supplemented by expert judgment, in an effort to maximize the heterogeneity between and homogeneity within strata. A great many professional man-hours were spent in the stratification process. However, it is questionable whether the amount of time devoted to reviews and refinements paid off in appreciable reductions in sampling variances. Intuitive notions about gains from stratification can be misleading. Methods of stratification that appear to be different often lead to about the same variances. (U.S. Bureau of the Census, Technical Paper No. 7, [1963] p.6)."

Selection of Primary Sampling Units. Counties were stratified on a limited number of key variables -- for example: the four Census regions, level of growth, metro/non-metro, and in the South and West, percent non-white. Thus, within each of the four Census regions, many strata were created. Counties with extremely small measures of size were grouped with adjacent counties, such that a minimum measure of size exists.

It should be noted that some counties or groups of counties had sufficient population to be selected with certainty, forming self-representing areas.

Self-representing areas were defined as those CMSA's (Consolidated Metropolitan Statistical Areas) or MSA's (Metropolitan Statistical Areas) with up to 80% of the size of a stratum. In total, the projected number of housing units for 1985 was 84,000,000. In a 100 PSU design, a stratum had 840,000 (84,000,000/100) housing units; in a 50 PSU design, a stratum is twice this size, 1,680,000 (84,000,000/50) housing units.

MSA's and CMSA's not having enough housing units to be self representing, as well as all non-MSA counties, were grouped into 60 non-self-representing stratum. In a 50 PSU design, those CMSA's or MSA's which were large enough to be self-representing in a 100 design but not in a 50 PSU design, each formed a non-self-representing stratum. When only 50 PSU's are used, 1/2 of the non-self-representing stratum are selected.

Selection of Secondary Selection Units

Each of the non-self-representing counties and self-representing areas are selected with known probabilities. The selection of the starting locations on the current study were obtained from an outside supplier, since all work was not complete on ORC's frame. Using the selection probabilities, the number of starting locations from each non-self-representing county or self-representing area were calculated. Those locations were then obtained from a source which combines a cross-listing of listed phone numbers (phone books) as well as motor vehicle registrations and other independent listings.

Size of Sample

To determine the number of housing units needed to complete 800 interviews certain assumptions were made regarding the coverage, occupancy, and response rates. Previous data indicated that those rates would be 92% coverage, 95% occupancy, and 45% response. To complete 800 interviews, 2034 (800/.92x.95x.45) housing units had to be assigned, distributed evenly over the starting indicators.

It is important to distribute the sample across as many sampling points within a PSU as possible. This limits the number of interviews obtained from any one starting indicator, which in turn reduces clustering effects. On average, it is desirable to complete 4 or 5 interviews per starting indicator; for 800 interviews, between 160 to 200 starting indicators would be needed. We decided to select 200 starting indicators but assign 180, each with 11 housing units. The remaining 20 were held in reserve to be used only if 800 interviews were not completed. /1

/1 It should be noted here that there was one error made in assigning the location number to two starting indicators; each was given the same number. Seven interviews were completed in one of the locations and, five were conqleted in the other location.

Sample Disposition

After initally assigning 180 starting indicators, 5 more were added, for a total of 2035 housing units (185x11). Of these, 3 listing areas were not worked on, due to lack of field interviewing availability. Table 1 and Table 2 show the final disposition of the sample; Table 1 presents the final result of calls for all 2035 assigned housing units while Table 2 has a reduced base, of those forms keypunched and on the screening file. The complete disposition, Table 1, includes the 33 housing units with no field attempt, 11 households where the wrong respondent was interviewed, and 8 forms not returned from the field services.

As can be seen from Table 1, 4% of the housing units assigned were vacant. Of the remaining 1952 housing units, there was no contact at 487 (24.9%). Household screening data was not obtained for 21.0% (409/1952), and no information was available for 1% of the housing units. Eligible respondents were identified in the remaining 53.4% (1042/1952) of housing units, while completes were obtained in 41.6% (813/1952) of the housing units. This calculation assumes all non-vacant housing units are eligible.

Using the punched dispositions (n=1983), interviews can be tracked as to completion by call. Table 3 presents the data, and indicates that male/female completion is almost identical. This shows that males did not need more calls to complete the same percentage of interviews as the females.

Finally, Table 4 presents the disposition of the sample by the results of call. Although the data is incomplete, it does show the trend of result by call. The percent of completes is relatively constant by call. Decreasing relationships are present in the percentage of respondents not at, busy, and vacant. Increasing trends were present for refused interviews and refused screens. Most interesting, the data indicate that additional calls yield interviews and information on housing units, although refusals increase.

Weights

The data for the current study were weighted using ORC's weighting program. Targets for 5 demographic variables were obtained from 1980 Census data, and from more current data available from the Census population surveys. The five variables were: race, region, education of head, household income, and number of people in the household. The weighting program at ORC inputs the target percentages then goes through a series of calculations until the lowest deviation from any one target is achieved.

TABLE 1

FINAL DISPOSITION

Elig	Eligible Respondents	(1,042)
Co	Complete	813
Re	Refused interview	171
Re .	Respondent not home	33
Ot	Other reason not completed	14
	Interviewed wrong respondent	11
Hou		
N	Housing Unit Not Contacted	(487)
	No one home	454
Hou	Listing areas not assigned	33
E		
I	Housing Unit Contacted	(409)
I	Busy	27
	Refused screen	356
No	Language barrier	26
Va	No Information	(14)
	No code	6
T(	Forms not returned	8
	Vacant Housing Unit	(83)
	TOTAL	2035

TABLE 3

INTERVIEWS COMPLETED BY CALL

Result of Call	Male		Female		Total	
	Number	%	Number	%	Number	%
1	124	.353	162	.351	286	.352
2	102	.291	130	.281	232	.285
3	72	.205	98	.212	170	.209
4	52	.148	70	.152	122	.150
5	1	.003	2	.004	3	.004
Total	(351)		(462)		(813)	

TABLE 4

DISPOSITION BY RESULT OF CALL

	1		2		3		4		5
	Number	%	Number	%	Number	%	Number	%	Number
Comp. Female	124	.063	102	.071	72	.070	52	.074	1
Comp. Male	162	.082	130	.090	98	.095	70	.100	2
(Total Comp.)*	(286)	.144	(232)	.161	(170)	.165	(122)	.174	(3)
Refused Int.*	57	.029	45	.031	34	.033	35	.050	1
Respondent not home	142	.072	94	.065	58	.056	17	.024	
Other reason not completed	11	.006	4	.003	1	--	1	.001	
No one home	1076	.543	801	.557	571	.554	374	.534	14
No code	48	.024	29	.020	19	.018	9	.013	
Busy	161	.081	103	.072	52	.050	14	.020	1
Refused screen*	126	.064	71	.049	74	.072	86	.122	
Language barrier*	13	.007	4	.003	8	.0082		.003	
Vacant*	63	.032	14	.010	9	.009	4	.006	
Total	(1983)		(1397)		(996)		(664)		
Discrepancy**			41	.029	35	.034	37	.053	
Base 1	1983		1438		1031		701		

*Final disposition

*Disposition code unknown. The base on each call should equal the number of housing units without a final disposition from prior calls. The bases ate now equal to the number without a final disposition plus the discrepancy. For example,on result call #3, the base is equal to 1498 - (366 + 41).